

What is claimed is:

1. A thermal interface material comprising:

a polymer matrix having a thermally conductive first face and an opposite thermally conductive second face; and

a plurality of carbon nanocapsules incorporated in the polymer matrix.
2. The thermal interface material as recited in claim 1, wherein the polymer is generally a reaction product of a polyether polyol and an isocyanate.
3. The thermal interface material as recited in claim 2, wherein a molecular weight of the polyether polyol is in the range from 500 to 5000.
4. The thermal interface material as recited in claim 2, wherein a functionality of the polyether polyol is in the range from 3 to 9.
5. The thermal interface material as recited in claim 2, wherein a molecular weight of the isocyanate is in the range from 200 to 800.
6. The thermal interface material as recited in claim 2, wherein a functionality of the isocyanate is in the range from 2 to 6.
7. The thermal interface material as recited in claim 1, wherein a diameter of each carbon nanocapsule is in the range from 5 to 50nm.
8. The thermal interface material as recited in claim 1, wherein the carbon nanocapsules are enclosed with thermally conductive material.
9. The thermal interface material as recited in claim 8, wherein the thermally conductive material comprises indium and/or copper.
10. The thermal interface material as recited in claim 1, wherein the carbon

nanocapsules are filled with metal nano-grains.

11. The thermal interface material as recited in claim 10, wherein the metal nano-grains comprise silver, copper and/or phosphor bronze .
12. An electronic assembly comprising:
 - a heat resource defining a first plane;
 - a heat sink defining a second plane immediately opposite to and parallel to said first plane;
 - a thermal interface material sealing a gap between said first and second planes;
 - wherein said thermal interface material is essentially composed of a plurality of carbon nanocapsules embedded within a solid polymer matrix.
13. The electronic assembly as recited in claim 12, wherein a diameter of each carbon nanocapsule is in the range from 5 to 50nm.
14. The electronic assembly as recited in claim 12, wherein the carbon nanocapsules are covered with a thermally conductive material.
15. The electronic assembly as recited in claim 14, wherein the thermally conductive material comprises indium and/or copper.
16. The electronic assembly as recited in claim 12, wherein the carbon nanocapsules are filled with metal nano-grains.
17. The electronic assembly as recited in claim 16, wherein the metal nano-grains comprise silver, copper and/or phosphor bronze .
18. A method of making an electrical assembly comprising:

providing a first plane obtaining heat from a heat source;

providing a second plane oppositely parallel to said first plane for transferring said heat to a heat sink; and

providing a thermal interface material sealing a gap between said first and second planes for transferring said heat from the first plane to the second plane; wherein

said thermal interface material comprises a plurality of carbon nanocapsules embedded in a solid while resiliently compressed material layer.

19. The assembly recited in claim 18, wherein said layer is defined by a polymer matrix.